(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: 0 072 699
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: 82304330.2

(22) Date of filing: 17.08.82

(51) Int. Cl.³: B 67 C 7/00
B 65 B 55/04

(30) Priority: 18.08.81 AU 305/81

(43) Date of publication of application:
23.02.83 Bulletin 83/8

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI NL SE

(71) Applicant: WRIGHTCEL LTD.
Cato Street
Auburn, Victoria(AU)

(72) Inventor: Anderson, Ian McArthur
Cato Street
Auburn Victoria(AU)

(74) Representative: Rees, David Christopher et al,
Kilburn & Strode 30 John Street
London WC1N 2DD(GB)

(54) **Method and system for aseptically filling a container with fluid.**

(57) A method and system for aseptic filling of containers. The flexible containers (1) are presterilized and a rupturable membrane (41) covers the inlet to the container. The filling head (20) includes a recess (46) below the outlet valve (22) and this recess is closed by the rupturable membrane when the container inlet is aligned with the filling head. After alignment sterilizing fluid is introduced into the recess to sterilize the outer surface of the membrane and the internal surfaces of the recess. Following sterilization the outlet valve (22) of the filling head is opened and the pressure of the liquid breaks the rupturable membrane allowing the container to be filled. Subsequent to completion of the filling cycle the inlet to the container is sealed and the sealed and filled container (1) is then removed from the filling head (20).

EP 0 072 699 A1

./...

Croydon Printing Company Ltd.

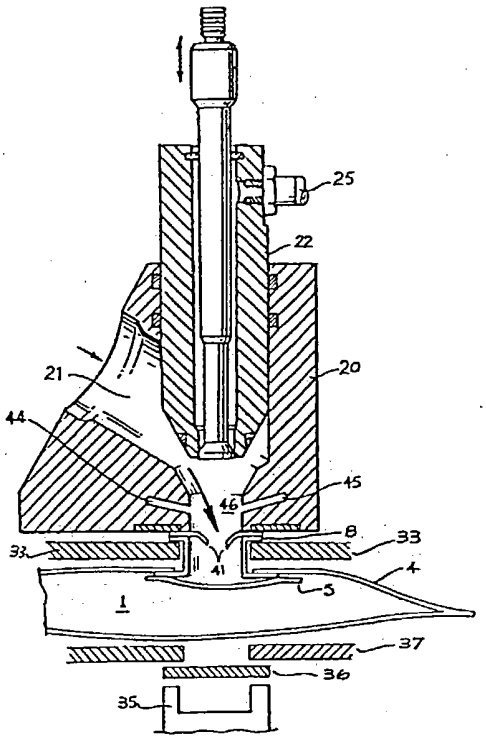


FIG. 3.

# METHOD AND SYSTEM FOR ASEPTICALLY FILLING A CONTAINER WITH A FLUID

The present invention relates to a method of aseptically filling a container with a fluid in which the outlet nozzle of a fluid dispenser is brought into abutment with the inlet of the container, the container is filled with the fluid, the container is sealed, and is then removed from the dispenser.

Synthetic plastics flexible containers are useful for storing and dispensing wine, fruit juice and other liquid foodstuffs. Aseptic filling is a desirable mode of operation to ensure that the possibility of contamination or deterioration of the liquid product does not occur.

Generally aseptic filling is carried out by sterilising the flexible containers internally and externally and maintaining the filling equipment in a sterile room. It is very difficult to ensure that the equipment and containers are maintained in aseptic conditions and the time and expense involved is high.

It is an object of this invention to provide a method and a system apparatus for aseptic filling of flexible containers with liquids in a more convenient fashion.

A method of aseptically filling containers is characterised by sterilising the container, the container inlet being covered by a rupturable closure, maintaining the internal surfaces of the dispenser in a sterile state; sterilising the surfaces of, and space between,

the said nozzle and the inlet; and subsequently breaking the rupturable closure prior to filling the container.

According to another aspect of the invention there is provided a system for aseptically filling a container with a degradable liquid for storage, the system comprising a flexible container having an inlet, a fluid dispenser having a filling head with an internally disposed valve member for regulating flow of the liquid, a container support arranged to bring the container into engagement with the filling head, means to actuate the valve member to allow liquid to pass into the container, and means to seal the inlet characterised by a rupturable closure over the inlet a recess between the valve member and the closure when the inlet is in engagement with the filling head, a sterilising fluid inlet and outlet in the recess, means to supply sterilising fluid to the recess and means to remove the sterilising fluid from the recess, radiation means for sterilising the container while closed by the closure, and means for rupturing the closure to allow the container to be filled.

It can be seen that the need to sterilise the filling station environment and the exterior of the flexible container is eliminated by ensuring that the interior of the machine i.e. the fluid conduits and filling head and the interior of the container are sterile. Consequently only the exterior of the inlet seal and the external surface of the nozzle and the space between the nozzle and the inlet need be sterilised and this

can be achieved as a preliminary step prior to filling.

The filling apparatus of this invention incorporates a filling nozzle in which the liquid outlet valve is located away from the outlet to form a recess communicating with which is an inlet for a sterilizing fluid and an outlet for said sterilizing fluid.

The inlet and outlet within the nozzle recess may be the same in which case the conduit from said inlet/outlet port is connected to a source of sterilizing fluid and an extractor for withdrawing said fluid from the nozzle recess.

Preferably Gamma radiation is used to sterilize the sealed containers prior to filling and hydrogen peroxide or steam is used to sterilize the surfaces and space between the outlet nozzle and the container closure.

This invention is particularly applicable to the apparatus described in European patent application 82300 145 8 and the flexible container system described in European patent publication no. 0 007685. The disclosure of those two specifications are incorporated herein by reference.

When using the flexible container according to the above mentioned patent applications it is possible to improve the ease of ensuring sterility of the interior of the container by providing a rupturable membrane cover over the outer opening of the collar. This ensures that the interior of the collar remains sterile. However, it is not essential to provide such a cover if the membrane seal on the inner end of the collar is adequate.

A preferred form of the invention will now be described, with reference to the drawings in which figure 1 is a schematic view of the container and collar, figure 2 is a sectional view of the filling nozzle, figure 3 is a cross-section through the head during the filling cycle, figure 4 is a cross-section showing the

sealing operation while the container is still in position at the filling head.

Referring to Figure 1, the bag - generally designated as 1 - comprises a wall 2 heat sealed at the periphery 3 to the lower wall 4. The flap 5 extends across an opening 7 in the flexible container wall 2 into which fits a collar 8. The flange 9 of collar 8 is heat sealed to the periphery 10 of the opening and the flap 5 is partly sealed to the flange of collar 8. As mentioned above the collar 8 can easily be secured to wall 2 by suitable machinery. The surface of flap 5 which faces the internal surface of wall 4 is non heat sealable therewith but the surface of flap 5 which faces flange 9 is heat sealable with that flange. Preferably flap 5 is a laminate of a heat sealable and a non heat sealable material.

Across the outer opening of collar 8 is a rupturable membrane 41 which is either integrally formed during the moulding of collar 8 or is heat sealed thereto during the operation of attaching the collar 8 to the container wall 2. Apart from the membrane 41 the container and collar is as described in European patent publication no. 0 007685 A1.

The filling apparatus is a modified version of that described in European patent application 82 300 1 458.

The filling head comprises a general body section 20 which includes a liquid inlet channel 21 closed by the valve member 22. This valve member 22 extends within the body section 20, and includes evacuation port 24 which is connected to a vacuum line 25. The vacuum port 24 is closed by the seal 26 and the valve stem 27 which reciprocates within the valve member 22.

When the valve member 22 is in its closed position the liquid inlet channel 21 is sealed and the seals 28, 29 and 30 ensure that no liquid can escape once the valve member 22 is closed.

The sterilizing fluid inlet 44 and outlet 45 are connected to the nozzle recess 46 below the valve member 22.

In figure 3 the complete flexible container is illustrated being held against the body section 20 by clamps 33. These clamps 33 grip the collar 8 and a trapdoor 36 supports the flexible container but provides a sufficient gap to enable liquid to flow through collar 8 past flap 5 and into the body of the flexible container 1. The support of trapdoor 36 is required to ensure that the pressure of the liquid during the filling does not rupture the container.

The sequence of operations is that initially a flexible container 1, is taken by clamps 33 and lifted into alignment with the filling head such that collar 8 and membrane 41 abut tightly against the seal 31 on the body section 20. After contact is made between body section 20 and membrane 41 sterilizing fluid (either gas or liquid) is passed in to the recess 46 via inlet 44 and sterilizes the inner surfaces of the recess and the surface of membrane 41. Subsequently the sterilizing fluid is withdrawn through outlet 45.

Another variation of this invention is to eliminate outlet 45 and either use the vacuum outlet 25 to remove sterilizing fluid or to extract it through the inlet 44.

After completion of the sterilization step valve member 22 rises to open the liquid inlet 21 to enable filling of the flexible container to occur. The membrane 41 is ruptured during filling by the pressure of the liquid and is subsequently not needed since flap 5 will provide the permanent seal for the filled container. Alternatively the membrane 41 may be ruptured by valve stem 27 prior to the opening of liquid inlet 21.

Upon the completion of filling the valve member closes inlet 21 and the valve stem 27 enters collar 8.

This ensures that all liquid in the collar 8 is displaced into the flexible container. At this point the trapdoor 36 is withdrawn and the heat sealing member 35 is brought into contact with the flexible container and results in the welding of flap 5 to the flange 9 of the collar 8 to seal the flexible container. Subsequent to sealing the filled flexible container is withdrawn from the filling head and if desired the tap can be inserted into collar 8.

Conventional pneumatics can be used to operate the movements of the various valves 22 and 27 and the clamps 33, the trapdoor 36 and sealing member 35. The timing and control of these components is similarly capable of being carried out by conventional control circuitry.

From the above it can be seen that this invention provides a simple means of ensuring aseptic filling of liquids.

CLAIMS

1. A method of aseptically filling a container (1) with a fluid in which the outlet nozzle of a fluid dispenser (20) is brought into abutment with the inlet (7) of the container (1), the container is filled with the fluid, the container is sealed, and is then removed from the dispenser (20), characterised by sterilising the container (1), the container inlet (7) being covered by a rupturable closure (41); maintaining the internal surfaces of the dispenser (20) in a sterile state; sterilising the surfaces of, and space between, the said nozzle and the inlet (7); and subsequently breaking the rupturable closure (41) prior to filling the container (1).

2. A method as claimed in Claim 1 characterised in that the container is filled with a liquid.

3. A method as claimed in Claim 1 or Claim 2 characterised in that the sealed container is sterilised by gamma radiation and the surfaces and space between the said nozzle and the closed inlet (7) are sterilised by hydrogen peroxide or steam.

4. A system for aseptically filling a container (1) with a degradable liquid for storage, the system comprising a flexible container (1) having an inlet (7), a fluid dispenser (20) having a filling head with an internally disposed valve member (22) for regulating flow of the liquid, a container support (35) arranged

to bring the container (1) into engagement with the filling head, means to actuate the valve member (22) to allow liquid to pass into the container (1), and means to seal the inlet (7), characterised by a rupturable closure (41) over the inlet (7), a recess (46) between the valve member (22) and the closure (41) when the inlet (7) is in engagement with the filling head, a sterilising fluid inlet (44) and outlet (45) in the recess (46), means to supply sterilising fluid to the recess (46) and means to remove the sterilising fluid from the recess (46), radiation means for sterilising the container (1) while closed by the closure (41), and means for rupturing the closure (41) to allow the container (1) to be filled.

5. A system as claimed in Claim 4, characterised in that the container (1) internally incorporates a membrane (5) covering the inlet opening (7), the membrane (5) being capable of being heat sealed to the periphery of the inlet opening (7) to seal the container (1).

6. A system as claimed in Claim 5, characterised in that the inlet (7) comprises a tubular collar (8) having an external opening closed by the rupturable closure (41) and an opening into the interior of the container (1) covered by the heat sealable membrane (5).

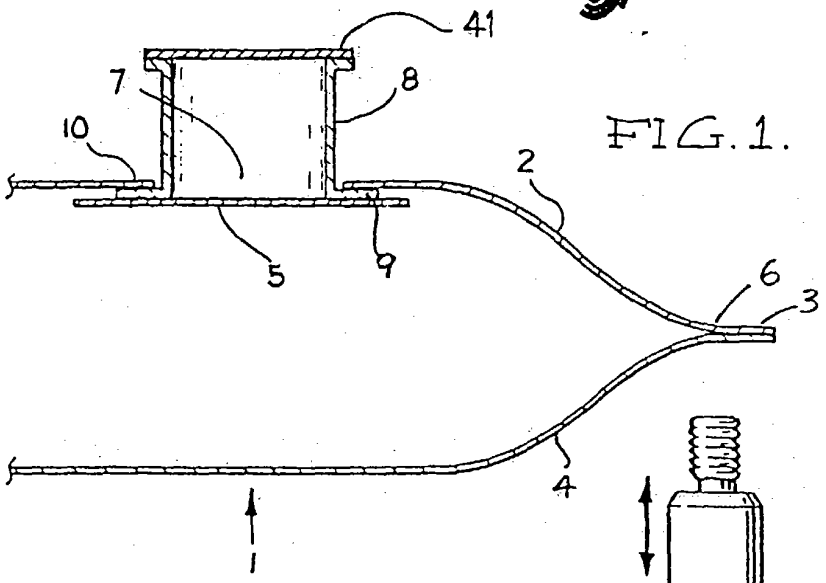


FIG. 1.

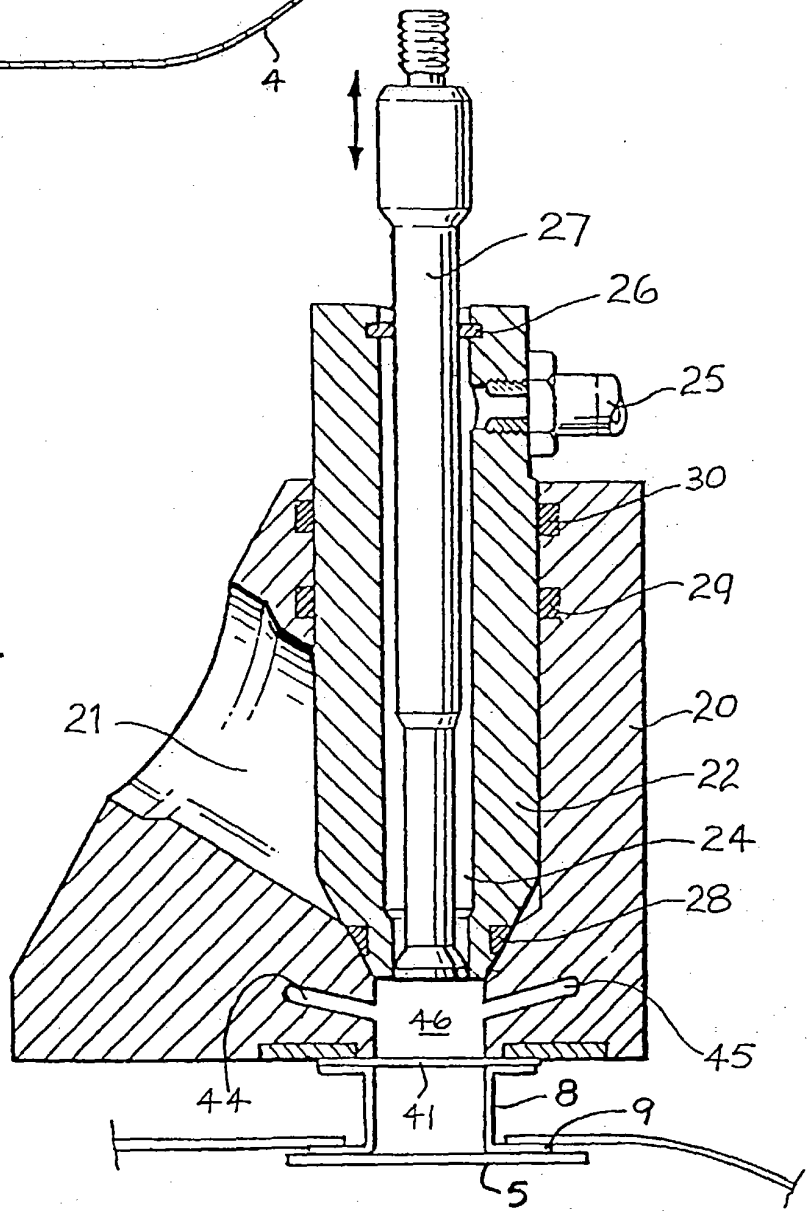


FIG. 2.

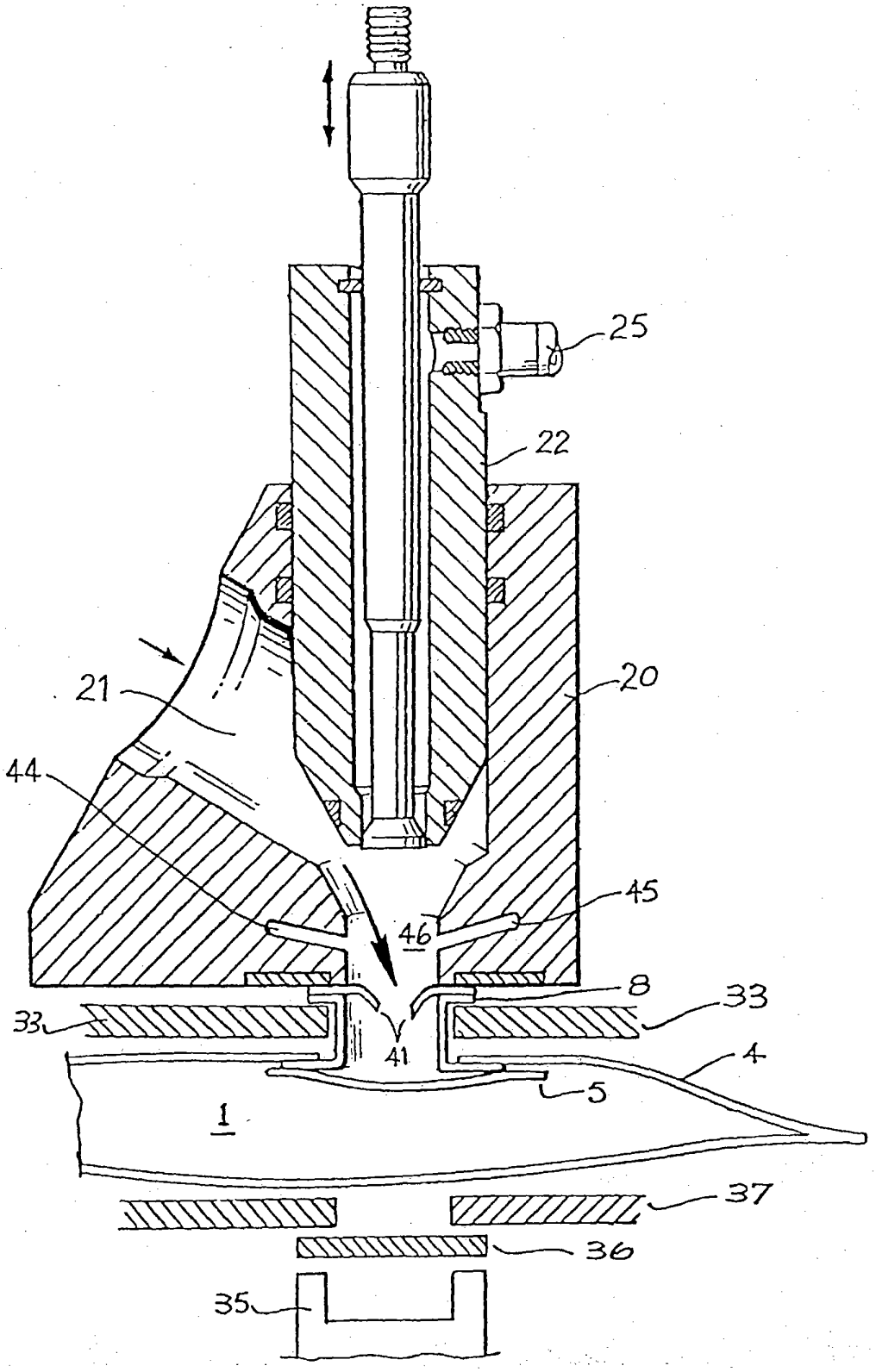


FIG. 3.

0072699

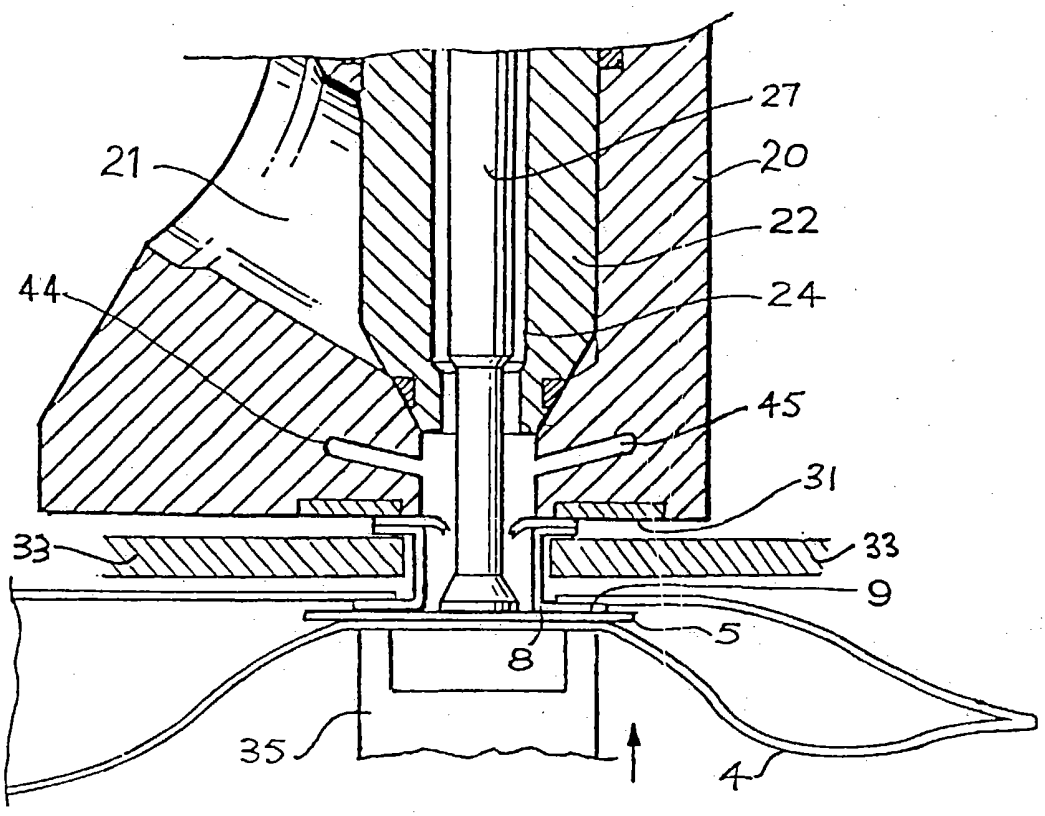


FIG. 4.

European Patent Office

# EUROPEAN SEARCH REPORT

0072699
Application number

## DOCUMENTS CONSIDERED TO BE RELEVANT

EP 82304330.2

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl. ³) |
|---|---|---|---|
| A | US - A - 2 761 603 (FAIRCHILD)<br>* Column 2, lines 58-67; column 3, lines 19,20; column 5, line 47 - column 6, line 18; fig. 4,6,7 * | 1-6 | B 67 C 7/00<br>B 65 B 55/04 |
| A | DE - B - 1 586 040 (EXPRESS DAIRY CO.)<br>* Claims 1,2; column 10, lines 18-23, 58-66; column 12, lines 18-23; column 13, lines 55-63; fig. 1,2,9 * | 1-4 | |
| A | EP - A1 - 0 026 055 (DIEMOLDERS)<br>* Page 6, line 28; page 7, line 27; fig. 5,6,8 * | 1,2,4, 6 | |
| P,D, A | EP - A2 - 0 056 701 (WRIGHTCEL LTD.) ( 28-07-1982)<br>* Page 8, lines 26-28; fig. 1,2,8 *<br>& PT-A-74 267 (01-02-1982) | 4,5,6 | TECHNICAL FIELDS SEARCHED (Int. Cl. ³)<br>B 65 B 39/00<br>B 65 B 55/00<br>B 65 D 30/00<br>B 65 D 51/00<br>B 65 D 77/00<br>B 65 D 85/00<br>B 67 C 3/00<br>B 67 C 7/00 |
| D,A | EP - A1 - 0 007 685 (WRIGHTCEL LTD.)<br>* Page 6, lines 1,2; fig. 3 * | 5,6 | |
| A | DE - A1 - 3 032 404 (SMITHFIELD)<br>* Page 15, lines 4-12; fig. 3-5 *<br>& GB-A-2 058 725 | | |

X The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| VIENNA | 15-11-1982 | TROJAN |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A technological background
O non-written disclosure
P intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L document cited for other reasons

& member of the same patent family, corresponding document

EPO Form 1503 03 82